wilcom

Model T247B
Calibration Checker

Operating Instructions

A Product of
Superior TeleTec Transmission Products, Inc.
Box 508 • D.W. Highway 03247 U.S.A.
Tel: 603/524-2622 Fax: 603/528-3804

Wilcom, Inc.
Daniel Webster Highway
Laconia, NH 03246

Tel: (603) 524-2622
(800) 222-1898
Repair: (800) 521-TEST
Fax: (603) 524-3735

810-840-002
March 1993

Model T247B Calibration Checker

Operating Instructions

WARRANTY

All products are warranted against defects in materials and workmanship. This warranty applies for a period of two (2) years from date of delivery, except for Fiber Optic instrumentation and equipment which have a one (1) year warranty on parts and two (2) years on labor. (The only exceptions in the digital testing equipment are the D550 Shark and D550 Hawkeye, which have a warranty of one (1) year from date of delivery.) Wilcom's obligation under this warranty is limited to servicing or adjusting each instrument returned to its factory within the warranty period, and to replace any components found to be defective. If determined that the defective condition is a result of misuse or abnormal operation, repairs will be billed.

LIMITATION OF WARRANTY

The foregoing warranties are the exclusive warranties provided by Wilcom, Inc. Wilcom will not be liable for any special, indirect, incidental or consequential damages whatsoever resulting from loss of use, loss of data or loss of profits arising out of or in connection with the use or performance of the product, even if Wilcom has been informed of the possibility of such damages in advance. All implied warranties, including without limitation warranties of merchantability and fitness for a particular purpose, as well as warranties arising from a course of dealing or usage of trade are expressly disclaimed.

PROPRIETARY INFORMATION

The information contained in this manual is the proprietary material of Wilcom, Inc., and may not be reproduced, used for manufacturing purposes, or disclosed to others for any use without written permission from Wilcom, Inc.

Contents

Introduction 1
Specifications 2
Panel Features 4
  Power Related 5
  Function Related 5
Operating the T247B 6
  Applying Power 6
  Test Set Up 6
  Test Procedures 6

Tables

1. Test the DIAL Function 7
2. Test the LOOP mA Function 7
3. Test the CKT LOSS Function 8
4. Test the Range Extender 9
5. Test the CKT NOISE Function 10
6. Test the PWR INFL Function 11

Figures

1. The T247B Calibration Checker 4

Digitized by the Internet Archive
in 2025

https://archive.org/details/manualsplus_07064

Introduction

The Model T247B Calibration Checker is a compact, lightweight test set designed for field calibration and function checking of all the various models of the Wilcom T136 Circuit Test Sets including T136Z-mod, T336 and T337. Individual switch selected outputs are provided for checking proper function of the T136* under test when set to DIAL, LOOP mA, CKT LOSS, CKT NOISE, and PWR INFL. The internal switching of the T247B provides the required interconnection of the T136 input leads for each function. The T247B is powered by 115V ac.

In the CKT LOSS, CKT NOISE, and PWR INFL functions, the T247B sends five switch-selectable tones between 325 and 4000 Hz. The 1000 Hz CKT LOSS and CKT NOISE circuits in the T136. The other outputs are less precise, but are sufficiently accurate to permit verification of the proper function of the T136. In CKT LOSS, the output level is the same for all five frequencies to permit checking the flat response of the T136. In CKT NOISE and PWR INFL, the output levels are set to the inverse of C-message weighting, so that a properly functioning T136 indicates a reference level (30 dBrnc CKT NOISE or 90 dBrnc PWR INFL) within allowable tolerance, for any selected frequency.

A reference check point at -8.5 dBm, as required by PUB 55020, is provided in addition to the 0 dBm point.

The T247B also includes a three-position, 10 dB per step, **LEVEL** switch that permits setting the output level 10 dB above or below the normal reference level. This switch is used with certain T136 models that have a different reference level, and for checking the range extender pushbuttons on the T136. A **HUM REJECT TEST** pushbutton adds a 180 Hz interference tone in the CKT LOSS function to verify the low frequency reject characteristic of the T136 CKT LOSS circuit. In the DIAL function, the **DIAL HOLD O.K.** LED on the T247B panel illuminates if the measuring set is drawing at least 20 mA dc. In the LOOP mA function, precise two-point calibration at 20 mA and 80 mA into 430 Ω is provided for checking the LOOP mA function in the T136 Z-mod. Other T136 test sets (excluding Z-mod) should read 22 mA in the 20 mA position and off scale in the 80 mA position. A **FROGGING** switch reverses the connection to the T and R leads of the T136. This checks proper polarity for dc LOOP mA measurement in those T136 units that are not equipped with a polarity bridge. Also, in CKT LOSS, CKT NOISE and unbalancing fault in the T136 shows up as an error in one position or the other of the T247B **FROGGING** switch.

The T247B output is balanced and provided with dc feed during all ac measurement checks. This makes it possible to use T247B for checking calibration of measuring sets with electronic hold.

---

* *"T136" hereinafter includes Z-mod T336 and T337.*

dc Outputs

DIAL function: Continuity check

LOOP mA function: 20.0 mA and 80.0 mA (switch selectable), 0.5% into a 430 Ω load.

NOTE: This check provides a 50 V nominal source through selectable resistance to produce the specified current in a 430 Ω load. When the T247B LOOP mA source is applied to a T136 (not Z-mod) Circuit Test Set, the reading should be 22 mA in the **20 mA** position and off-scale in the **80 mA** position.

All ac Measurement Functions: 50V dc through 1500 Ω, or approximately 26 mA into 430 Ω.

ac Outputs

Frequency: 325, 500, 1000, 3000,or 4000 Hz, all ±0.1%, switch selectable.

Output Impedance

CKT LOSS and CKT NOISE: 600 Ω, balanced, to terminals marked **GRN** and **RED**.

PWR INFL: Low impedance; terminals marked **GRN** and **RED** are both connected to high side of output, terminal marked **YEL** to low side.

Output Level

CKT LOSS: (The **TEST SET READS** switch is in the **REF** position)

Reference = -8.5 dBm
at 1000 Hz: -8.5 dBm ± 0.05 dB
At other frequencies: -8.5 dBm ± 0.2 dB

Reference = 0 dBm: 0 dBm ± 0.2 dB

CKT NOISE: (**TEST SET READS** switch is in the **REF** position)
At 1000 Hz: 30.0 dBrnc ± 0.1 dB
At 4000 Hz: 30.0 dBrnc ± 0.5 dB
At other frequencies, 30.0 dBrnc ± 0.3 dB

(**NOTE:** Output level is inverse C-message weighted to provide an output that is flat when measured in dBrnc.)

PWR INFL:	(The **TEST SET READS** switch is in the **REF** position) At 1000 Hz: 80 dBrnc ± 0.2 dB At 4000 Hz: 80 dBrnc ± 1.0 dB At other frequencies, 80 dBrnc ± 0.5 dB (**NOTE:** The inverse C-message weighted voltage output is flat when measured in dBrnc. At 1000 Hz, 0 dBrnc PWR INFL is defined as 224.5 μV.)
TEST SET READS switch:	Increases or decreases CKT LOSS, CKT NOISE, or PWR INFL output level by 10.0 dB ± 0.22 dB.
HUM REJECT TEST button:	60 Hz line frequency at 10 dB above signal added to output in CKT LOSS function. The test set should reject this frequency sufficiently that level reading increases less than 0.5 dB. **NOTE:** The Hum test does not function when **10 dB ABOVE REF** is selected.
Power:	115V, 50/60 Hz or -44V to -52V office battery

Environmental

Operating Temperature:	0 to 50 C; for full specified accuracy, +15 C to +40 C
Humidity:	95% at 35 C, 50% at 50 C
Storage Temperature:	-55 C to +70 C
Altitude (non-operating):	50,000 ft. (15,000 m)

Physical

Height:	8.0 in. (20.32 cm)
Width:	11.0 in. (27.94 cm)
Depth:	8.6 in. (21.59 cm)
	(**NOTE:** Dimensions include portable case, cover handle, wall mounting bracket, and feet)
Weight:	8 lbs. (3.62 kg)

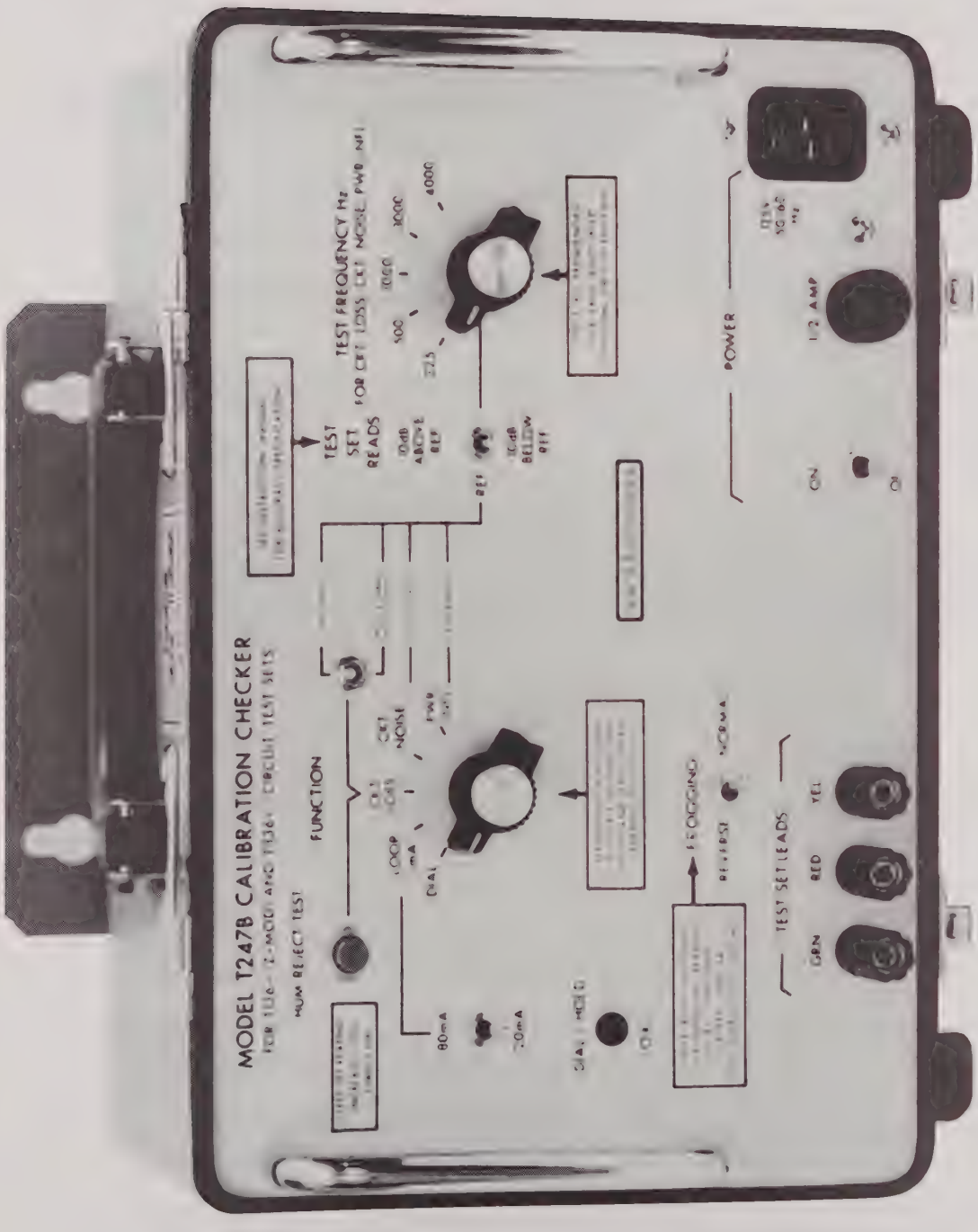


Figure 1. The T247B Calibration Checker

The following describes the function of each switch,indicator, and connector located on the T247B front panel. Refer to Figure 1 for their locations on the test set.

Power Related

The **ac power receptacle** is a three-prong male plug that, with the line cord supplied with the test set, supplies 115V ac power to the test set through this connection.

The twist-lock fuse holder is located to the left of the power receptacle. The **1/2 ampere fuse** provides ac protection to the T247B. When replacing this fuse, do not exceed the 1/2 ampere rating.

The On/Off **POWER** switch applies power to the T247B.

Function Related

Three **TEST SET LEADS** terminals, labeled **GRN**, **RED**, and **YEL**, provide the connecting points for the clip leads of the T136 being tested.

The **FROGGING** switch (**REVERSE** or **NORMAL** position) interchanges the internal electrical connections to the **GRN** and **RED** terminals.

The **FUNCTION** switch selects the T136 function to be tested. The internal connections to the **TEST SET LEADS** terminals are switched to provide the proper signal configuration for the individual functions. These include:

- **DIAL**
- **LOOP mA**
- **CKT LOSS** (A reference point at -8.5 dBm, as required by PUB 55020, is provided in addition to the 0 dBm point)
- **CKT NOISE**
- **PWR INFL**

The **DIAL - HOLD O.K.** LED, when illuminated, verifies the continuity of the T136 DIAL function and indicates the measuring set is drawing at least 20 mA dc.

The **HUM REJECT TEST** pushbutton adds a 180 Hz interference tone in the CKT LOSS function to verify the low frequency reject characteristics of the T136.

The **TEST FREQUENCY Hz** switch selects one of five fixed internal oscillator frequencies for application to the T136 for verification of its frequency response or weighting characteristic.

The **LEVEL** Switch selects the reference level at 1000 Hz for the CKT LOSS, CKT NOISE, and PWR INFL functions. The REF (reference) level for each function is indicated on the panel.

Applying Power

For operation, connect the line cord, supplied with the set, to the recessed male connector on the front panel. The other end may be plugged into any 115 volt three-wire convenience outlet.

Test Set Up

Set the Circuit Test Set **FUNCTION** switch to the **BATT TEST** position, if one is provided. Push the **PUSH TO MEAS** button and observe a meter reading in the **GOOD BATT** portion of the scale, or note that **LO BATT** does not appear on the digital readout. Replace the batteries if required.

Connect the clip leads of the Circuit Test Set (**RED**, **GRN**, and **YEL**) to the terminals on the T247B identified by the same colors.

Set the T247B Controls as follows:

FUNCTION:	**DIAL**
LEVEL:	**REF**
REF:	**0 dBm**
TEST FREQUENCY Hz:	**1000**
80 mA/20 mA:	**20 mA**
FROGGING:	**NORMAL**
POWER:	**ON**

Set the Circuit Test Set **FUNCTION** switch to the **DIAL** position.

> **NOTE:** The T247B and Circuit Test Set are now set to perform the first functional check, for DIAL operation. The checks for the remaining four functions and for the range extenders should be performed sequentially to insure the correct positioning of all switches.

Test Procedures

The test procedures in Tables 1 through 5 are designed to examine the functions of LOOP mA, CKT LOSS, Range Extender, CKT NOISE, and PWR INFL. The procedures are organized in steps; included with the procedure in each step are the expected result and tolerance, if any.

Table 1. Test the DIAL Function

Step	Procedure	Result	Tolerance
1	Complete the set up described in *Test Set Up*.	—	—
2	Short Circuit Test Set **DIAL** terminals with clip lead.	**DIAL-HOLD O.K.** LED lights.	

Table 2. Test the LOOP mA Function

Step	Procedure	Result	Tolerance
1	Set the T247B **FUNCTION** switch to the **LOOP mA** position.	—	—
2	Set the Circuit Test Set switch to the **LINE mA/LOOP mA** position.	Meter indicates 20 mA.	±0.6 mA
		For non Z-Mod T136s: 22 mA	±2.0 mA
3	Set the **FROGGING** switch to the **REVERSE** position.	Meter indicates 20 mA for the following test sets: Z-Mod: T136BSB, T136BSC, T136BPT.	±0.6 mA
		Meter pegs against the left pin for the following test sets: T136B, T136B-1, T136B-2, T136BC, T136BF, T136BNY, T136U-04.	—
		Reading, -20 mA for T336/T337	±0.6 mA
4	Set the **FROGGING** switch to the **NORMAL** position.	—	—
5	For T136U-04 only: Press the **PUSH FOR mA X2** button on the T136.	The T136 meter indicates 11.0 mA (not Z-Mod)	±3.8 mA
6	Repeat at 80 mA.	Meter reads 80 mA (off-scale for non Z-Mod T136s)	±2.0 mA

NOTE: To calibrate, adjust Circuit Test Set dc termination (420 Ω) for correct 80 mA reading; then adjust mA sensitivity for correct 20 mA reading. Repeat until both readings are within tolerance.

Table 3. Test the CKT LOSS Function

Step	Procedure	Result	Tolerance
1	Set the T247B and the Circuit Test Set **FUNCTION** switches to the **CKT LOSS** position.	The **DIAL-HOLD OK** LED lights.	—
2	Press the Circuit Test Set **PUSH TO MEAS** button.	The meter indicates 0 dBm.	±0.2 dB*
3	Repeat step 2 for each position of the T247B **TEST FREQUENCY Hz**.	The meter indicates 0 dBm at each frequency.	±0.2 dB
4	Repeat steps 2 and 3 at the **REF = -8.5 dBm** position.	-8.5 dBm	±0.2 dB
5	Set the **FROGGING** switch to the **REVERSE** position.	—	—
6	Repeat steps 2 through 4.	Meter indicates 0 dBm or -8.5 dBm at each frequency	±0.2 dB
7	Return the **TEST FREQ. Hz** switch to the **1000** position, and **REF** to 0 dBm.	—	—
8	While holding the T136 **PUSH TO MEAS** button, press the T247B **HUM REJECT TEST** button.	Meter reading increases less than 0.5 dB	

* If this tolerance is not met, it is possible to adjust the gain of the Test Set. Refer to the Test Set Operating Instructions.

NOTE: For T136BC and T136U-04, use the **10 dB BELOW REF LEVEL** switch position to check at -10 dBm. The check at -8.5 dBm is specified in PUB 55020.

Table 4. Test the Range Extender
(For T136BSB, T136BSC, T136BPT Test Sets)

Step	Procedure	Result	Tolerance
1	Press both the T136 **PUSH TO MEAS** and **+10 dB** buttons.	The T136 meter indicates -10 dBm.	±1.0 dB
2	Set the T247B **LEVEL** switch to the **10 dB ABOVE REF** position. Press the T136 **PUSH TO MEAS** and **+10 dB** buttons.	The T136 meter indicates 0 dBm.	±0.5 dB
3	Set the T247B **LEVEL** switch to the **10 dB BELOW REF** position. Press both the **PUSH TO MEAS** and **-10 dB** buttons.	The T136 meter indicates 0 dBm.	±0.5 dB
4	Return the T247B **LEVEL** switch to the **REF** position.	—	—

NOTE: For Circuit Test Sets having different range extender buttons, these instructions may be modified to suit.

Table 5. Test the CKT NOISE Function

Step	Procedure	Result	Tolerance
1	Set the T247B and Circuit Test Set **FUNCTION** switches to the **CKT NOISE** position.	The **DIAL-HOLD O.K.** LED illuminates.	—
2	Press the **PUSH TO MEAS** button.	The meter indicates 30 dBrnc.	±0.3 dB*
3	Repeat step 2 for each position of the T247B **TEST FREQ. Hz** switch.	Meter indicates 30 dBrnc at each frequency.	325 Hz: ±1.8 dB 500 Hz: ±1.8 dB 1000 Hz: ±0.3 dB 3000 Hz: ±2.8 dB 4000 Hz: ±3.8 dB
4	Repeat steps 2 and 3 with the T247B **LEVEL** switch in **10 dB**	Meter indicates 20 dBrnc at each frequency.	325 Hz: ±1.8 dB 500 Hz: ±1.8 dB 1000 Hz: +0.3 dB 3000 Hz: ±2.8 dB 4000 Hz: ±3.8 dB
5	Set the **FROGGING** switch to the **REVERSE** position.	—	—
6	Repeat steps 2 through 4.		
7	Return the **TEST FREQ. Hz** switch to **1000**, the **FROGGING** switch to **NORMAL**, and the **LEVEL** switch to **REF**.	—	—

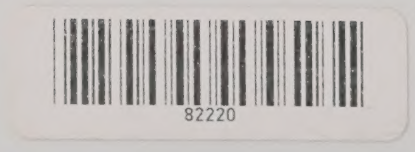
* If this tolerance is not met, you can adjust the gain of the Test Set. Refer to the Test Set Operating Instructions.

Table 6. Test the PWR INFL Function

Step	Procedure	Result	Tolerance
1	Set the T247B and the Circuit **FUNCTION** switches to **PWR INFL.**	**DIAL-HOLD OK** LED lights.	—
2	Set the T247B **LEVEL** switch to **10 dB ABOVE REF.**		
3	Press the **PUSH TO MEAS** button.	The meter indicates 90 dBrnc.	±0.5 dB
4	Repeat step 2 for each position of the T247B **TEST FREQ. Hz** switch.	The meter indicates 90 dBrnc at each frequency.	325 Hz: ±2.0 dB 500 Hz: ±2.0 dB 1000 Hz: ±0.5 dB 3000 Hz: ±3.0 dB 4000 Hz: ±4.0 dB
5	Set the **LEVEL** switch to **REF.**		
6	Repeat steps 2 through 4 for each position of the T247B **TEST FREQ. Hz** switch	The meter indicates 80 dBrnc at each frequency.	325 Hz: ±2.0 dB 500 Hz: ±2.0 dB 1000 Hz: ±0.5 dB 3000 Hz: ±3.0 dB 4000 Hz: ±4.0 dB
7	Set the **FROGGING** switch to **REVERSE.**	—	—
8	Repeat steps 2 through 6.		
9	Return the **TEST FREQ. Hz** switch to **1000** and the **FROGGING** switch to **NORMAL.**	—	—

NOTE: For T336B and T337, repeat the procedure with the **LEVEL** switch at **10 dB BELOW REF.** The reading should be 70 dBrnc with the same tolerance.

NOTE: If the Test Set fails to operate or meet a specific tolerance of the Test Procedures, it should be calibrated or repaired, as required.


82220